Naval Education and
Training Command

NAVEDTRA 12528
October 1992
0502-LP-214-8900

Training Manual
(TRAMAN)

Construction Mechanic, Advanced

0502LP2148900

Although the words "he," "him," and "his" are used sparingly in this manual to enhance communication, they are not intended to be gender driven nor to affront or discriminate against anyone reading this text.

Naval Education And Training Program Management Support Activity

CONSTRUCTION MECHANIC, ADVANCED

NAVEDTRA 12528

1992 Edition Prepared by
EQCM Thomas A. Browning

PREFACE

This training manual (TRAMAN) is a self-study package that enables the enrollees to gain information that will help them fulfill the requirements of their rating.

Designed for individual study and not formal classroom instruction, this TRAMAN provides subject matter that relates directly to the occupational qualifications of the Construction Mechanic rating. The nonresident training course (NRTC) provides the usual way of satisfying the requirements for completing the TRAMAN. Each NRTC assignment consists of questions designed to lead the student through the TRAMAN.

This TRAMAN was prepared by the Naval Education and Training Program Management Support Activity, Pensacola, Florida, for the Chief of Naval Education and Training. Technical assistance was provided by the following commands: 2nd NCB Detachment Gulfport, CBC Gulfport, Mississippi; CBPAC Equipment Office, Naval Construction Battalion Center, Port Hueneme, California; Naval Construction Training Command, CBC Gulfport Mississippi; and Naval Construction Training Command, CBC Port Hueneme, California.

Revised 1992

Stock Ordering No.
0502-LP-214-8900

Published by
NAVAL EDUCATION AND TRAINING PROGRAM
MANAGEMENT SUPPORT ACTIVITY

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON, D.C.: 1992

THE UNITED STATES NAVY

GUARDIAN OF OUR COUNTRY

The United States Navy is responsible for maintaining control of the sea and is a ready force on watch at home and overseas, capable of strong action to preserve the peace or of instant offensive action to win in war.

It is upon the maintenance of this control that our country's glorious future depends; the United States Navy exists to make it so.

WE SERVE WITH HONOR

Tradition, valor, and victory are the Navy's heritage from the past. To these may be added dedication, discipline, and vigilance as the watchwords of the present and the future.

At home or on distant stations as we serve with pride, confident in the respect of our country, our shipmates, and our families.

Our responsibilities sober us; our adversities strengthen us.

Service to God and Country is our special privilege. We serve with honor.

THE FUTURE OF THE NAVY

The Navy will always employ new weapons, new techniques, and greater power to protect and defend the United States on the sea, under the sea, and in the air.

Now and in the future, control of the sea gives the United States her greatest advantage for the maintenance of peace and for victory in war.

Mobility, surprise, dispersal, and offensive power are the keynotes of the new Navy. The roots of the Navy lie in a strong belief in the future, in continued dedication to our tasks, and in reflection on our heritage from the past.

Never have our opportunities and our responsibilities been greater.

CONTENTS

CHAPTER 1

PUBLIC WORKS

TRANSPORTATION SHOPS SUPERVISOR

A supervisor should possess a large amount of TACT and DIPLOMACY. Directing shop activities requires that you contact all types of people; for example, the mechanics who work for you, the personnel (military and/or civilian) who operate the equipment, and the officer (or civilian) to whom you are responsible. You must be careful not to let prejudices interfere with your good judgment.

A transportation maintenance shop supervisor will need all of his past experience in diagnosing mechanical troubles accurately, scheduling and planning repair work skillfully, using all kinds of repair equipment, and directing the many activities in maintaining transportation and earth-moving equipment.

At some time during your career in the Navy, you may be assigned as a foreman in a public works (PW) transportation maintenance shop. You may also have to serve as supervisor of a Construction Battalion equipment maintenance shop. Because of the variation in the two different types of duty, the responsibilities of a foreman in a PW transportation maintenance shop will be discussed in this chapter, and the battalion equipment company shops supervisor's responsibilities will be discussed in the following chapter. Although many of the positions have the same basic duties, the methods of doing the work may differ considerably. Certain areas of cost control vary a great deal. Duty in a transportation maintenance shop includes work of a continuing nature. Therefore, to provide continuity, civil service personnel are also employed.

PUBLIC WORKS TRANSPORTATION DEPARTMENT FUNCTIONAL ORGANIZATION

A PW transportation department of a naval shore facility is generally stationary. As a supervisor in the PW maintenance branch, you would probably not have to plan and construct a new transportation shop, but, rather, would supervise the repair of equipment. However, if you are involved in the establishment of a new base, you will probably be consulted about the location and layout of the maintenance shops. You can obtain detailed information on the physical layout of the buildings by referring to *Naval Facilities Planning Guide,* P-437, Facilities Number 214 20B, Drawing 6028198. The location of tools and shop equipment depends on the amount and type of equipment to be maintained.

The PW transportation organization discussed in this chapter is typical of the type usually found within a public works activity. The titles and organization may vary from activity to activity. To learn more about these organizations, you should obtain and study current NAVFAC instructions and publications that pertain to the public work centers and public work departments. By referring to figure 1-1, you can see that the

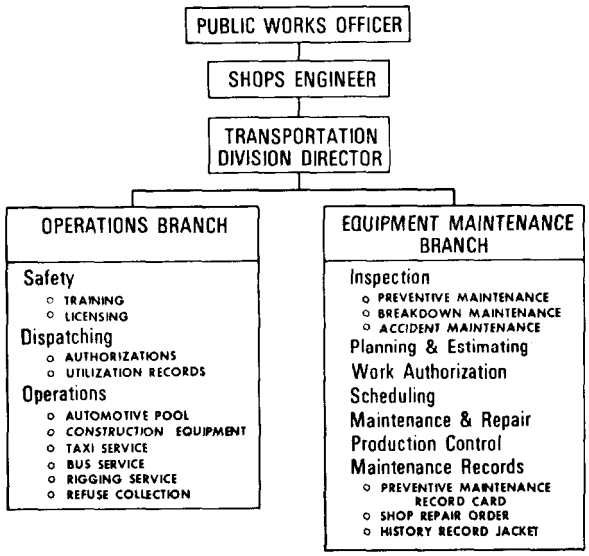


Figure 1-1.—Functional organization for transportation management.

transportation division is broken down into two branches: operations branch and equipment maintenance branch. Note that both come under the control of the transportation division director, who reports through a chain of command to the public works officer (PWO).

DUTIES AND RESPONSIBILITIES OF SUPERVISORY PERSONNEL

This phase of our discussion deals with the duties and responsibilities of various supervisory personnel within the maintenance branch. The individual assignments depend upon the needs of the activity and the skill and experience of personnel available. The public works officer makes the final decision.

TRANSPORTATION DIVISION DIRECTOR

As head of the transportation division, the transportation director exercises full technical, managerial, and administrative responsibility for organizing, directing, and controlling the work of the division. The director also functions as the technical advisor within and outside the activity in planning and procuring vehicle/equipment requirements for the activity and other supported customers.

The transportation director exercises complete managerial responsibilities for the efficient, economical, and timely administration of the divisions; directs operations assignments; manages scheduled preventive maintenance (PM) as well as repair/overhaul; and is charged with the requisition and disposition of automotive vehicles, construction equipment, materials-handling equipment, and miscellaneous specialized equipment.

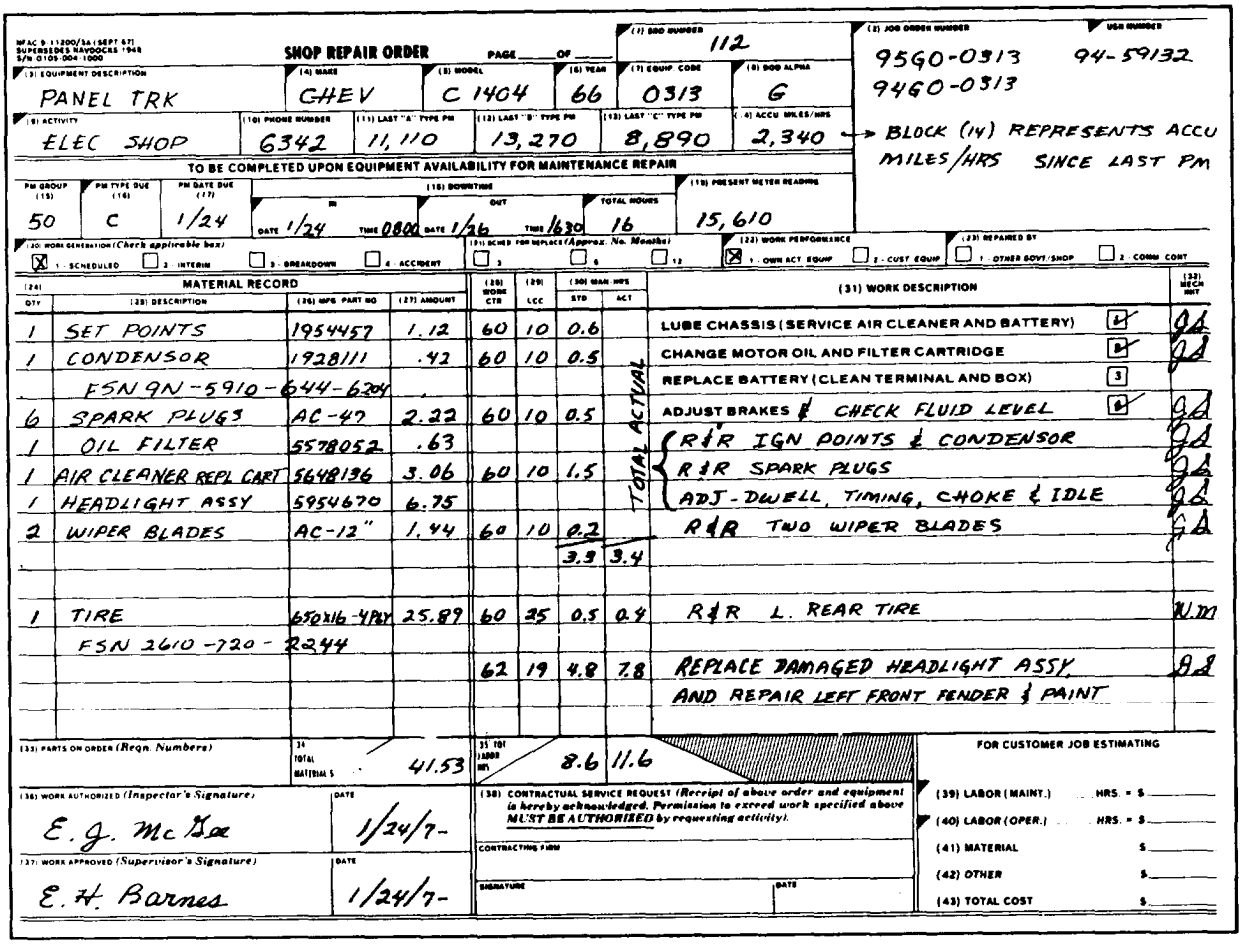
MANAGER OF THE EQUIPMENT MAINTENANCE BRANCH

The manager of the maintenance branch is responsible for planning, work direction, and administration, and acts as, and assumes the duties of, the transportation director in case of the absence of that person. The maintenance branch's responsibilities include the following:

1. Preparing and submitting the maintenance division fiscal financial budget
2. Scheduling work for subordinate supervisors and planning for the efficient use of materials and equipment
3. Organizing, coordinating, and directing the work activities of personnel and units supervised
4. Maintaining a balanced workload for subordinate work units by shifting personnel effectively among the units
5. Coordinating the work in areas of responsibilities with other activities and department/division supervisory personnel to maintain a balanced scheduled work flow
6. Reviewing and analyzing production, cost, and personnel utilization records to evaluate the progress of work and to control or reduce costs
7. Reviewing completed work records (Shop Repair Order, NAVFAC Form 9-11200/3A, shown in figure 1-2, and other computer reports) to assure that production and quality standards are met
8. Inspecting the shop areas periodically and checking safety conditions, cleanliness, security, requirements for materials, and shop equipment
9. Acting on any personnel matter concerning subordinates and assisting in the resolution of grievances referred by subordinate supervisors
10. Promoting safety programs within the immediate organization, reviewing the safety performance of the supervisors, and initiating corrective action as required
11. Seeing that progress, production, cost, and other records are prepared, maintained, and consolidated
12. Developing training programs for employees and subordinate supervisors

PRODUCTION CONTROL SUPERVISOR

The production control supervisor is responsible for receiving, inspecting, and classifying, within applicable Navy codes, all new and used equipment; preparing reports on equipment received; scheduling equipment into the shop for its first servicing; and arranging for its inclusion into the PM program. Additionally, the production control supervisor determines parts and tools required to support equipment during its life cycle; directs the inspection of vehicles coming into the shop to find the nature and extent of repair or PM service required; and determines the most economical means and methods of repairs. The production control supervisor applies standard hours and cost estimates on individual equipment jobs; initiates shop repair orders; and schedules work into the various work centers/ shops for orderly accomplishment. Finally, the production control supervisor directs the inspection of the mechanics' work while in progress; ensures a quality inspection upon



NAVFAC 9-11200/3A (SEPT 67) SUPERSEDES NAVDOCKS 1948 S/N 0105-004-1000

SHOP REPAIR ORDER PAGE ____ OF ____

(1) SRO NUMBER: 112

(2) JOB ORDER NUMBER: 9560-0313 / 9460-0313 — USA NUMBER: 94-59132

BLOCK (14) REPRESENTS ACCU MILES/HRS SINCE LAST PM

(3) EQUIPMENT DESCRIPTION	(4) MAKE	(5) MODEL	(6) YEAR	(7) EQUIP CODE	(8) SRO ALPHA
PANEL TRK	CHEV	C 1404	66	0313	G

(9) ACTIVITY	(10) PHONE NUMBER	(11) LAST "A" TYPE PM	(12) LAST "B" TYPE PM	(13) LAST "C" TYPE PM	(14) ACCU MILES/HRS
ELEC SHOP	6342	11,110	13,270	8,890	2,340

TO BE COMPLETED UPON EQUIPMENT AVAILABILITY FOR MAINTENANCE REPAIR

PM GROUP (15)	PM TYPE DUE (16)	PM DATE DUE (17)	(18) DOWNTIME IN	(18) DOWNTIME OUT	TOTAL HOURS	(19) PRESENT METER READING
50	C	1/24	DATE 1/24 TIME 0800	DATE 1/26 TIME 1630	16	15,610

(20) WORK GENERATION (Check applicable box): [X] 1 - SCHEDULED [ ] 2 - INTERIM [ ] 3 - BREAKDOWN [ ] 4 - ACCIDENT

(21) SCHED FOR REPLACE (Approx. No. Months): [ ] 3 [ ] 6 [ ] 12

(22) WORK PERFORMANCE: [X] 1 - OWN ACT EQUIP [ ] 2 - CUST EQUIP

(23) REPAIRED BY: [ ] 1 - OTHER GOVT SHOP [ ] 2 - COMM CONT

MATERIAL RECORD

(24) QTY	(25) DESCRIPTION	(26) MFG PART NO	(27) AMOUNT
1	SET POINTS	1954457	1.12
1	CONDENSOR	1928111	.42
	FSN 9N-5910-644-6204		
6	SPARK PLUGS	AC-47	2.22
1	OIL FILTER	5578052	.63
1	AIR CLEANER REPL CART	5648196	3.06
1	HEADLIGHT ASSY	5954670	6.75
2	WIPER BLADES	AC-12"	1.44
1	TIRE	650x16-4PLY	25.89
	FSN 2610-720-2244		

(28) WORK CTR	(29) LCC	(30) MAN HRS STD	(30) MAN HRS ACT	(31) WORK DESCRIPTION	(32) MECH INIT
60	10	0.6		LUBE CHASSIS (SERVICE AIR CLEANER AND BATTERY) [X]	GA
60	10	0.5		CHANGE MOTOR OIL AND FILTER CARTRIDGE [X]	GA
				REPLACE BATTERY (CLEAN TERMINAL AND BOX) [3]	
60	10	0.5		ADJUST BRAKES & CHECK FLUID LEVEL [X]	GA
				R&R IGN POINTS & CONDENSOR	GA
60	10	1.5		R&R SPARK PLUGS	GA
				ADJ - DWELL, TIMING, CHOKE & IDLE	GA
60	10	0.2		R&R TWO WIPER BLADES	GA
		3.9	3.4	TOTAL ACTUAL	
60	35	0.5	0.4	R&R L. REAR TIRE	WM
62	19	4.8	7.8	REPLACE DAMAGED HEADLIGHT ASSY, AND REPAIR LEFT FRONT FENDER & PAINT	GA

(33) PARTS ON ORDER (Requ. Numbers)

(34) TOTAL MATERIALS 41.53

(35) TOT LABOR HRS 8.6 11.6

FOR CUSTOMER JOB ESTIMATING

(36) WORK AUTHORIZED (Inspector's Signature): E. J. McKee — DATE 1/24/7-

(37) WORK APPROVED (Supervisor's Signature): E. H. Barnes — DATE 1/24/7-

(38) CONTRACTUAL SERVICE REQUEST (Receipt of above order and equipment is hereby acknowledged. Permission to exceed work specified above MUST BE AUTHORIZED by requesting activity).

CONTRACTING FIRM ____ SIGNATURE ____ DATE ____

(39) LABOR (MAINT.) ____ HRS. = $ ____

(40) LABOR (OPER.) ____ HRS. = $ ____

(41) MATERIAL $ ____

(42) OTHER $ ____

(43) TOTAL COST $ ____

Figure 1-2.—Shop Repair Order, NAVFAC Form 9-11200/3A.

completion of this work; and directs the maintenance of PM records, shop backlog records, and vehicle history files.

MAINTENANCE AND REPAIR FOREMAN

The foreman of the maintenance and repair shop supervises subcenters, such as the body and paint shop, battery shop, tire shop, toolroom, and lubrication shop. Responsibilities of the foreman include the following:

1. Establishing priorities and sequences in which scheduled workloads will be accomplished, primarily on a day-to-day/job-by-job basis
2. Analyzing and interpreting shop repair orders, work requests, and other work documentation and specifications to determine work requirements
3. Assigning work among subordinates and providing specific material requirements
4. Consulting with higher authority and staff personnel to make sure that appropriate tools, materials, and equipment are available as needed
5. Requesting and coordinating the services and work of other shops when required
6. Assigning work by written or oral orders
7. Assisting in the training of subordinates in work methods, procedures, and the operation of tools and equipment, both new and already in use
8. Certifying that the work is efficient and economical and that the work is performed safely
9. Anticipating operational problems and acting to overcome delays
10. Directing and recommending changes in shop layout to improve efficiency
11. Ensuring that subordinates houseclean
12. Issuing and enforcing safety practices and fire regulations

13. Checking attendance and leave of subordinates and other personnel matters

CONSTRUCTION EQUIPMENT SHOP FOREMAN

The foreman of the construction and specialized equipment shop supervises the machine shop as a subcenter. The responsibilities are basically the same as those given under the maintenance and repair foreman, except for the technical supervision. This shop is responsible for the maintenance, repair, and major overhaul (mechanical and electrical) of specialized equipment, such as tractors, graders, ditchdiggers, bulldozers, road rollers, asphalt machines, farm tractors, jet starters, auxiliary power units, emergency generators, pumps, and aircraft tow-tractors.

The machine shop bores cylinders; rebuilds all types of gasoline and diesel engines, automatic transmissions, and differentials; and performs other related repairs.

PREVENTIVE MAINTENANCE

The most important phase of the maintenance system is scheduled periodic preventive maintenance (PM). PM is the systematic inspection, detection, and correction of potential equipment failures before they develop into major defects. The purpose of PM is to keep equipment in safe and reliable condition with maximum equipment availability and minimum cost of maintenance.

OPERATOR MAINTENANCE

Operators are the first line of defense against equipment wear, failure, and damage. Equipment must be inspected by the operator daily—before, during, and after operations—so that defects or malfunctions can be detected before they result in serious damage, failure, or accident.

It is your responsibility, as a CM1, to see that the operators are performing their duties. You should work with the operations branch in making recommendations regarding operator PM. Changes may be necessary in the operator PM to cope with certain operating conditions. You may need to set up classes of instruction for the operators so that they will become familiar with the right way to maintain their equipment, especially when new equipment is received in the activity. If you do set up classes, be sure to coordinate your training periods with the foreman in charge of the equipment operations branch so that you do not interfere with the foreman's equipment operating schedules. Also, try to have the equipment on hand so you can point out maintenance services that need attention. It is better to hold the instructions with small groups and to keep them as informal as possible. Do not forget to stress operator maintenance on the overall operating efficiency of the equipment.

SERVICE STATION MAINTENANCE

Service station maintenance is the service you would expect from any first-rate filling station when you purchase fuel; namely, washing the windshield and checking the oil, battery and radiator water, fan belt, tire condition, and so forth. Unfortunately, shortages of personnel have sometimes curtailed this type of maintenance. Service station maintenance is a visible area of public works but is not intended to relieve the operators of their responsibility.

SAFETY INSPECTIONS

Vehicles will be inspected periodically by qualified automotive inspection personnel for safety as follows:

Each motor vehicle will be inspected for safety at intervals not to exceed 12 months or 12,000 miles, whichever occurs first. To avoid unnecessary downtime, perform the safety inspection at the time of the scheduled serviceability inspection according to the manufacturer's recommendation.

All deficiencies uncovered during the safety inspection that affect the safe operation of the vehicle will be corrected before the vehicle becomes operational again.

UNSCHEDULED MAINTENANCE SERVICE

Unscheduled maintenance service is the correction of deficiencies reported by the vehicle operator that occur between scheduled safety or other inspection and services prescribed by the manufacturer. Unscheduled maintenance services will be limited to correcting only those items reported as deficient by the operator and confirmed by qualified inspection personnel. Unreported deficiencies observed by the inspector at an unscheduled service and, in particular, those affecting safety are to be corrected before the vehicle is released for service.

COST CONTROL

The Navy's cost control system is designed to obtain complete cost data on maintenance and operation of automotive, construction, fire fighting, railway, weight-handling, and materials-handling

equipment. Actual performance of maintenance work is compared to hourly standards for such work, as established and published by various manufacturers and the Naval Facilities Engineering Command (NAVFAC), to determine efficiency of maintenance operations. The Navy also uses cost control to justify the performance of repairs at its activities.

RECORDS AND REPORTS

In the cost control system, all costs accumulated in the maintenance and operation of the equipment are recorded and charged to appropriations and allotments. These costs may be director indirect labor or material. They may also include services provided, such as shop stores, utilities, and even building maintenance.

To evaluate performance and to assist in effective management of transportation maintenance, a series of transportation management reports has been designed that will furnish useful information to management at all levels. These reports are prepared by the accountable fiscal office from the cost records maintained in that office and from feeder reports prepared by the transportation office. These reports provide the facts required by supervisors to pinpoint deficient areas and should be used for corrective action.

The objectives of the transportation management reports are to provide the following:

1. Information on the productivity of maintenance shop personnel (actual versus standard hours)
2. Data on overhead costs
3. Comparison between activity costs and commercial costs
4. Comparison between actual direct labor hours expended and established maintenance input standards
5. Comparison between actual and standard maintenance costs

Variances indicated in reports frequently require a searching review of detailed shop records to determine the causes. The individual Shop Repair Order, NAVFAC Form 9-11200/3A, shown in figure 1-2, and the Shop Repair Order (Continuation Sheet), NAVFAC Form 9-11200/3B, shown in figure 1-3, contain all of the basic data required for this review.

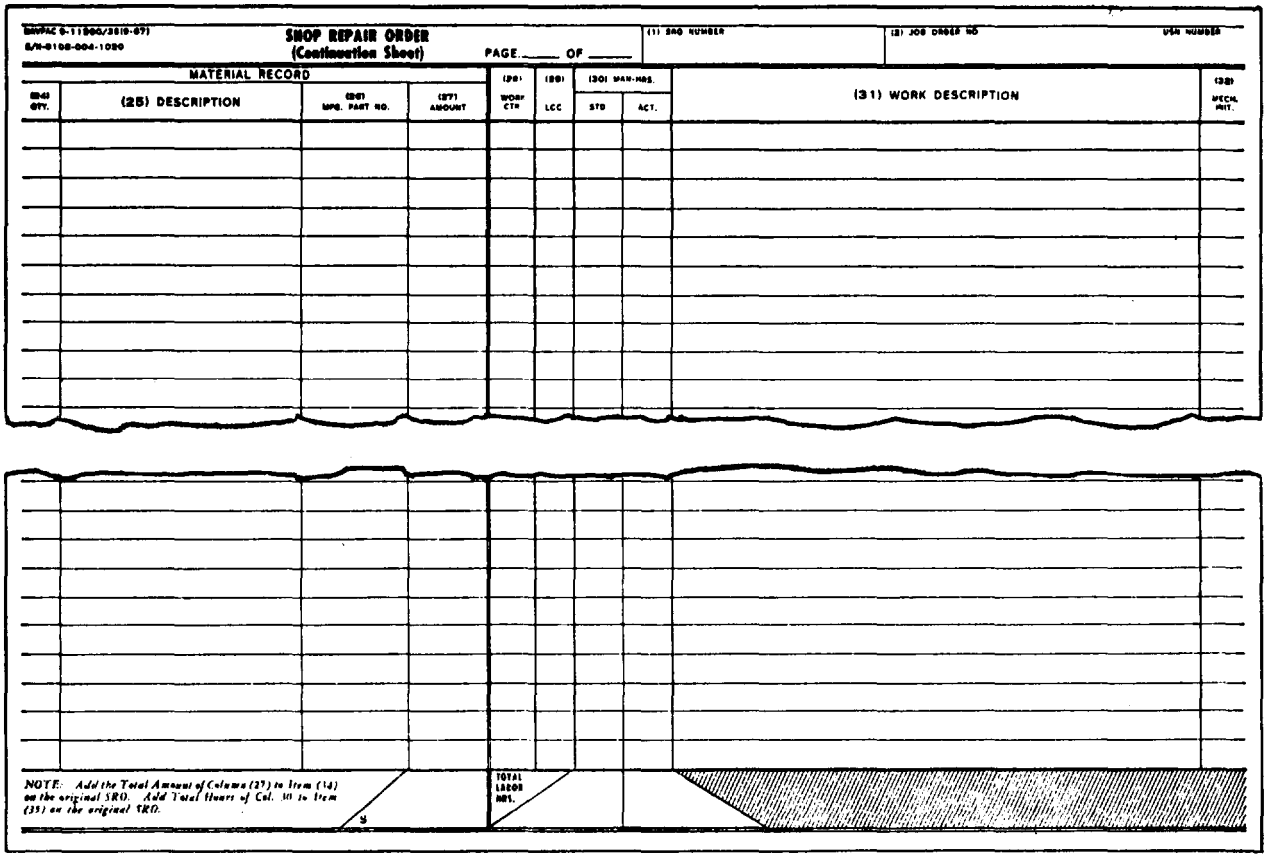


Figure 1-3.—Shop Repair Order (Continuation Sheet), NAVFAC Form 9-11200/3B.

A shop repair order (SRO) is the transportation equivalent of the specific job order. It is initiated by the control section inspector/estimator or other specifically authorized personnel designated by the equipment maintenance branch supervisor. It is the authorizing document, estimating form, and cost control record of maintenance expenditures. Repair costs are estimated in advance to ensure that costs stay within economic limitations and to provide a standard against which to measure job performance and productivity of the mechanics. Estimates for transportation repairs are taken from commercial *Flat Rate Manuals* or estimating guides. Labor costs and material costs are logged on the SRO by shop personnel, and the completed document then serves as a principal source of data for transportation reports and analysis.

DEPTH OF MAINTENANCE, REPAIR, AND OVERHAUL

The depth of maintenance, repair, and overhaul is governed by many factors, mainly economics. The goal is to provide the best service available at the least possible costs.

The geographic location of an activity has a great influence on the depth of maintenance, repair, and overhaul that a maintenance shop must perform. Maintenance costs must compare with national standards. It is easy to see that an activity near a large city, where many repair services are available at commercial shops, is limited as to the type of repairs allowed. Because of the large volume of work, many of these specialized commercial shops can perform services at a reduced cost. When the commercial shop is nearby, there are no appreciable transportation or shipping costs to be added to the cost of repairs. On the other hand, an activity located a great distance from commercial sources of repair services and supplies would be able to justify doing its own major repairs because of the time, need, and shipping charges involved in having the work performed outside.

The size of an activity also governs the amount and depth of maintenance, repair, and overhaul services. Here, volume is the determining factor that reduces the maintenance cost to a level comparable to that of available commercial facilities.

COST JUSTIFICATION

The Navy system of preventive maintenance, implemented by the cost control system with its accounting procedures and reports, is a continuing justification for the transportation maintenance shop's existence. Costs must be justified unless the work is highly classified or the geographical location is extreme.

Remember that needed repairs alone do not justify repair by the service maintenance shop.

PRESERVATION, STORAGE, AND DEPRESERVATION OF VEHICLES AND EQUIPMENT

There is more to storing vehicles and equipment than merely driving them into open areas, warehouses, or active storage. The process of preparing vehicles and equipment for storage is complex. It is important that you consider all components of the equipment, as well as the basic unit, to ensure efficient operation with a minimum amount of work after storage. The objective of preservation and storage is to provide efficient and economical protection to components and equipment from environmental and mechanical damage during handling, shipment, and storage from the time of original purchase until they are used. NAVFAC P-434, *Management and Operations Manual for Construction Equipment Departments,* chapters 8 and 9 and appendix E, contains the standards and guides for equipment preservation.

The three levels of preserving and packaging equipment for storage are A, B, and C.

Level A is that level of preservation that will protect adequately against corrosion, deterioration, and physical damage during shipment, handling, indeterminate storage, and worldwide redistribution.

Level B is the degree of preservation and packaging that will protect adequately against known conditions less hazardous than A. Level B should be based on firmly established knowledge of the shipment and storage conditions and a determination that money will be saved. This level requires a higher degree of protection

than that afforded by Level C preservation and packaging.

Level C is the level of preservation that protects adequately against corrosion, deterioration, and physical damage during shipment from the supply source to the first receiving activity for immediate use.

The proper level of preservation depends on the availability of information on the probable handling, shipping, storing units, and conditions that the vehicles and equipment will undergo before final issue to the command. Physical characteristics of the vehicles and equipment must also be considered.

An approved cleaning technique is a first in preservation. The effectiveness of an applied preservative may be measured by the quality of the surface preparation. All corrosion and contaminants have to be removed before a preservative is applied.

No single cleaning method or material is suitable for all cleaning situations. The selection of a cleaning method, or combination of methods, depends on one or more of these factors:

1. Material composition of part
2. Complexity of construction and assembly
3. Nature and extent of contaminants
4. Amount and age of equipment
5. Availability of cleaning materials and equipment

Steam cleaning is suitable for removal of greases, tar, road deposits, and other contaminants. This process is particularly adaptable to parts other than the ENGINE and GEARCASE EXTERIORS of vehicles and equipment that ordinarily would not be disassembled before preservation. Engines and gearcases should be cleaned by spraying with a decreasing solvent, by allowing for solvent penetration, and, finally, by flushing with a clean petroleum solvent or by wiping with a clean cloth.

"Active storage" means that complex equipment is maintained in serviceable condition by the operation of all components for brief periods at regularly scheduled intervals. When lubricants are redistributed, friction is reduced and deterioration is prevented or reduced to a minimum. Only unboxed automotive and construction equipment is included in the active storage program.

Upon reactivation, material preserved and packaged for storage or shipment requires depreservation and servicing before use. Equipment is to be lubricated under the manufacturer's instructions. Seals and closures should be removed. Housings, casings, and other enclosures should be drained of preservatives and refilled with specified operating fluids before operation. Those components that were removed for storage should be reinstalled.

Upon activation, in equipment containing piston-cylinder components, such as internal combustion engines and air compressors, rotate the crankshaft slowly with the throttle closed, ignition off, and compression release lever (if so equipped) in START position.

Avoid abrasives in removing preservatives. Remove blocking, wiring, or strapping from clutch levers or pedals secured in a partially disengaged position. Adjust drive belts on which tension has been released. Flush from the system any corrosion inhibitor mixed with preservative oil.

TECHNIQUES OF SCHEDULING

An effective and efficient maintenance program requires the establishment and upkeep of a preventive maintenance scheduling system and a sound shop control procedure. According to *Management of Transportation Equipment*, NAVFAC P-300, vehicles and equipment are to be scheduled for inspection and servicing according to the time, mileage, or operating hours prescribed by the manufacturer's recommendations. As a minimum, the schedule is to ensure that each vehicle is inspected for safety at least every 12 months or 12,000 miles, whichever occurs first. The schedule can be formulated by determining the estimated annual miles of each vehicle and dividing by the manufacturer's recommended service interval. This will determine the number of service intervals per year for each vehicle. Dividing the number of working days per year (252) by the number of service intervals per year will develop the number of working days between

SPECIFICATION FOR SCHEDULED MAINTENANCE INSPECTIONS AND SERVICES

VEHICLE MAKE MODEL(S) YEAR(S)

OPERATION	SERVICE INTERVAL								See Manual Page
1000 MILES →	6	12	18	24	30	36	42	48	
ENGINE									
Change engine oil and filter	X	X	X	X	X	X	X	X	03-12
Clean and refill oil bath air cleaner (if so equipped)	X	X	X	X	X	X	X	X	03-03
Replace dry-type air cleaner filter (6 cyl.)		X		X		X		X	03-03
Replace dry-type air cleaner filter (8 cyl.)				X				X	03-03
Test crankcase emission system. Clean system and replace emission control valve if required	X	X	X	X	X	X	X	X	04-11
Clean crankcase emission system hoses, tubes, fittings, carburetor spacer and replace if necessary. Replace emission control valve		X		X		X		X	04-11
Clean crankcase filler breather cap	X	X	X	X	X	X	X	X	04-11
Replace fuel system filter (gas engine)				X				X	04-08
Inspect thermactor exhaust emission control system hoses and replace if required (on trucks so equipped)		X		X		X		X	
Drain, flush, and refill cooling system	EACH 24 MONTHS								04-06
Check and lubricate exhaust control valve. Free up if necessary (if so equipped)	X	X	X	X	X	X	X	X	03-05
Clean and adjust distributor points—replace as required (Clean distributor cap)		X		X		X		X	04-11
Check and adjust carburetor—idle speed and fuel mixture		X		X		X		X	04-14
Check and clean external choke mechanism		X		X		X		X	04-11
Check and adjust ignition timing—initial timing, mechanical and vacuum advances, and vacuum retard (if so equipped)		X		X		X		X	04-13

Figure 1-4.—Sample Format for Specification for Scheduled Maintenance Inspections and Services.

inspections or the designated inspection group for each vehicle. From this determination, a schedule can be established providing a quota of vehicles for inspection daily that will provide a balanced shop workload. A vehicle/construction equipment service record form similar to that shown in figure 1-4 should be used to record service intervals and service performed.

PROGRESS CONTROL AND SHOP WORKLOAD

Control, positive direction of shop workloads, is achieved through current information on direct labor available in shop work centers, backlog man-hours by work center, and man-hours assigned. One means is a transportation maintenance shop workload control board (fig. 1-5) to display the workload status of the shop/work centers. The indicator on each line can be moved across the scale to show current standard hours of backlog. This board may also show the available man-hours by shop or subcenter.

Progress in obtaining the most availability of safe working equipment within budget restrictions may be charted as required by local commands.

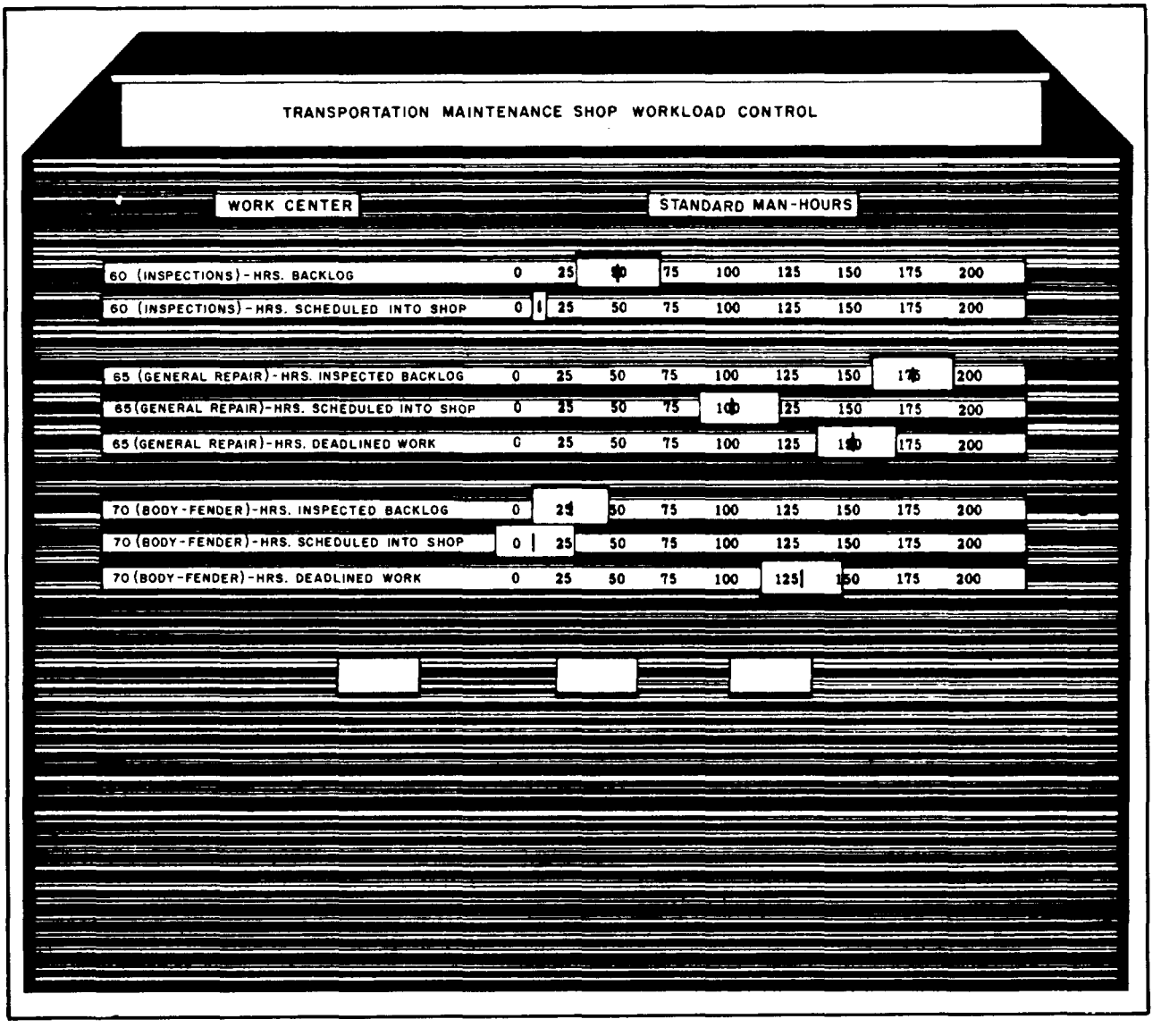
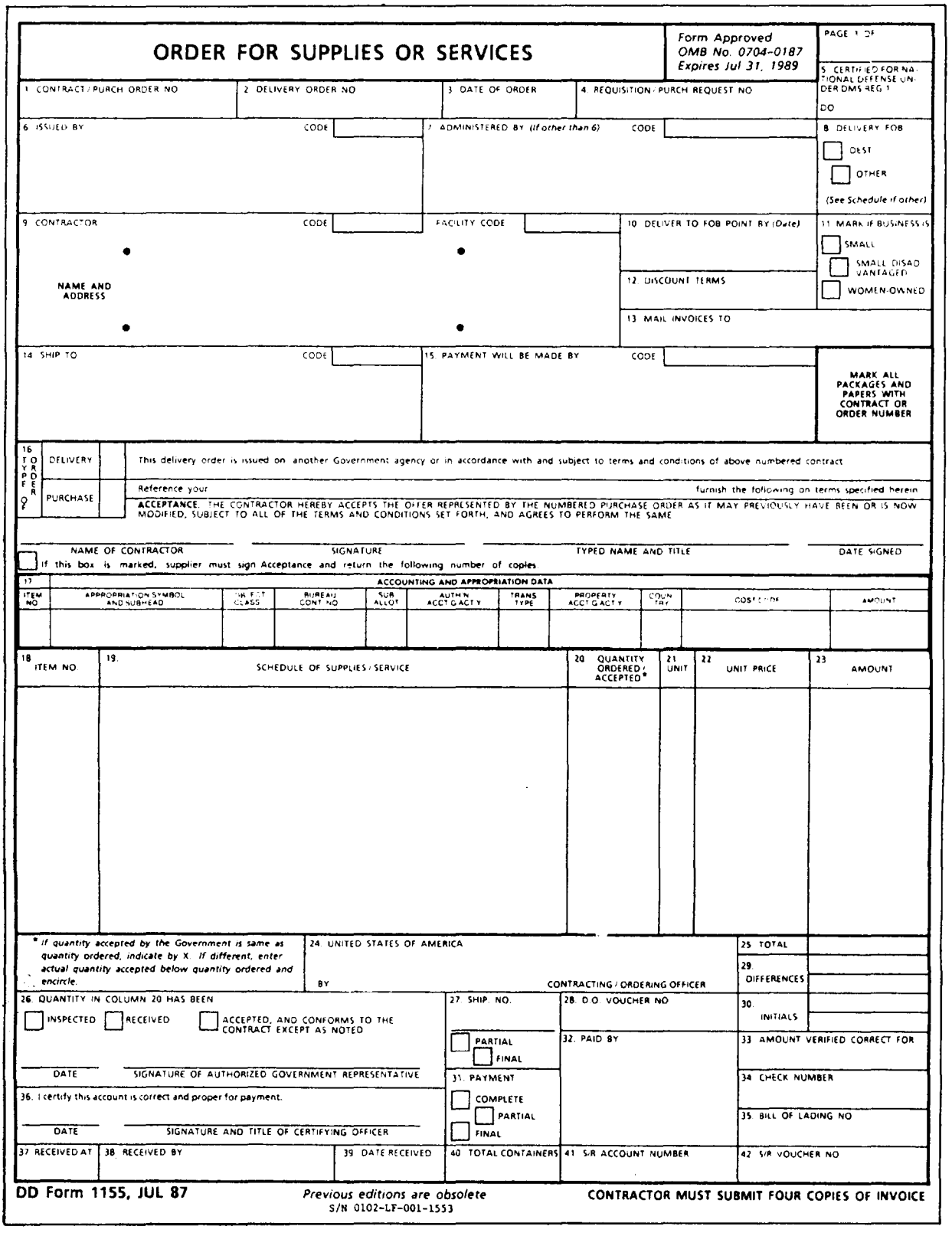


Figure 1-5.—Transportation maintenance shop workload control board.



ORDER FOR SUPPLIES OR SERVICES

Form Approved
OMB No. 0704-0187
Expires Jul 31, 1989

PAGE 1 OF

5 CERTIFIED FOR NATIONAL DEFENSE UNDER DMS REG 1
DO

1 CONTRACT / PURCH ORDER NO | 2 DELIVERY ORDER NO | 3 DATE OF ORDER | 4 REQUISITION / PURCH REQUEST NO

6 ISSUED BY — CODE

7 ADMINISTERED BY (If other than 6) — CODE

8 DELIVERY FOB
☐ DEST
☐ OTHER
(See Schedule if other)

9 CONTRACTOR — CODE — FACILITY CODE

NAME AND ADDRESS

10 DELIVER TO FOB POINT BY (Date)

11 MARK IF BUSINESS IS
☐ SMALL
☐ SMALL DISAD VANTAGED
☐ WOMEN-OWNED

12 DISCOUNT TERMS

13 MAIL INVOICES TO

14 SHIP TO — CODE

15 PAYMENT WILL BE MADE BY — CODE

MARK ALL PACKAGES AND PAPERS WITH CONTRACT OR ORDER NUMBER

16 TYPE OF ORDER
DELIVERY ☐ This delivery order is issued on another Government agency or in accordance with and subject to terms and conditions of above numbered contract.
PURCHASE ☐ Reference your ____ furnish the following on terms specified herein.

ACCEPTANCE. THE CONTRACTOR HEREBY ACCEPTS THE OFFER REPRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUSLY HAVE BEEN OR IS NOW MODIFIED, SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH, AND AGREES TO PERFORM THE SAME

NAME OF CONTRACTOR | SIGNATURE | TYPED NAME AND TITLE | DATE SIGNED

☐ If this box is marked, supplier must sign Acceptance and return the following number of copies:

17 ACCOUNTING AND APPROPRIATION DATA

ITEM NO	APPROPRIATION SYMBOL AND SUBHEAD	SUB CLASS	BUREAU CONT NO	SUB ALLOT	AUTH N ACCT G ACT Y	TRANS TYPE	PROPERTY ACCT G ACT Y	COUN TRY	COST CODE	AMOUNT

18 ITEM NO	19 SCHEDULE OF SUPPLIES / SERVICE	20 QUANTITY ORDERED / ACCEPTED*	21 UNIT	22 UNIT PRICE	23 AMOUNT

* If quantity accepted by the Government is same as quantity ordered, indicate by X. If different, enter actual quantity accepted below quantity ordered and encircle.

24 UNITED STATES OF AMERICA
BY ____ CONTRACTING / ORDERING OFFICER

25 TOTAL
29 DIFFERENCES
30 INITIALS

26 QUANTITY IN COLUMN 20 HAS BEEN
☐ INSPECTED ☐ RECEIVED ☐ ACCEPTED, AND CONFORMS TO THE CONTRACT EXCEPT AS NOTED

DATE ____ SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE

27 SHIP NO.
☐ PARTIAL ☐ FINAL

28 D.O. VOUCHER NO

32 PAID BY

33 AMOUNT VERIFIED CORRECT FOR

31 PAYMENT
☐ COMPLETE ☐ PARTIAL ☐ FINAL

34 CHECK NUMBER

35 BILL OF LADING NO

36 I certify this account is correct and proper for payment.

DATE ____ SIGNATURE AND TITLE OF CERTIFYING OFFICER

37 RECEIVED AT	38 RECEIVED BY	39 DATE RECEIVED	40 TOTAL CONTAINERS	41 S/R ACCOUNT NUMBER	42 S/R VOUCHER NO

DD Form 1155, JUL 87 — Previous editions are obsolete — S/N 0102-LF-001-1553 — CONTRACTOR MUST SUBMIT FOUR COPIES OF INVOICE

Figure 1-6.—Order for Supplies or Services, DD Form 1155.

Accuracy in man-hours expended and maintenance cost is essential to meaningful data. Comparison of standard hours with actual man-hours could indicate a shortage of ability, lack of training, or even shop or tool features that cause delays. When standard hours are added to induction time, you should be able to forecast an accurate completion date. Time spent obtaining repair parts may also be charted and used to determine positive or negative availability or management. Some public works have contracted repair parts suppliers to increase availability and reduce lead time.

CONTRACT MAINTENANCE AND REPAIRS

In the event that a public works is undermanned or has the personnel but not the necessary skills, it may be necessary to look for alternatives to keep up with the maintenance and repair schedule. Commercial contractors and other government agencies are two alternatives to help balance your workload.

COMMERCIAL CONTRACTORS

When work is performed by commercial contractors or facilities, an Order for Supplies or Services, DD Form 1155 (fig. 1-6), supported by an SRO is required. The control section supervisor ensures that the SRO covering equipment scheduled for contract work is properly documented and turned over to the shop inspector. The inspector lists the necessary repairs on the SRO, applies the manufacturer's flat rate standards, and returns the SRO to the control section supervisor. After the contract labor rate, contract number, order number, and necessary accounting data are added, the SRO is forwarded to the contracting officer. The contracting officer prepares an original and six copies of the DD Form 1155. One copy is forwarded to the comptroller, where the estimated amount is entered on allotment records as an obligation. The original and four copies, together with both copies of the SRO, are then returned to the shop dispatcher for delivery with the equipment to the contractor. When the equipment is delivered to the contractor, a custody receipt is to be obtained and returned to the shop dispatcher. After the completion of repairs, the contractor returns the equipment to the shop dispatcher with the original and one copy of the SRO, four copies of the DD Form 1155, and the original and three copies of the contractor's bill. The shop dispatcher turns the equipment over to the shop inspector and destroys the custody receipt. The equipment is then reinspected for satisfactory repairs. The inspector and the control section supervisor review the work and the bill. If all is correct, the bill is certified for payment. The original SRO, three copies of the DD Form 1155, and three copies of the contractor's bill are to be forwarded to the appropriate office for final processing and payment. The green copy of the SRO, one copy of the DD Form 1155, and one copy of the contractor's bill are to be filed in the vehicle history jacket for the life of the vehicle.

OTHER GOVERNMENT AGENCIES

The procedures for the performance of work or services by other government agencies, military and nonmilitary, are basically the same as for work performed by commercial contractors. Exact information for these procedures may be found in chapter 18 of *Management of Transportation Equipment,* NAVFAC P-300.

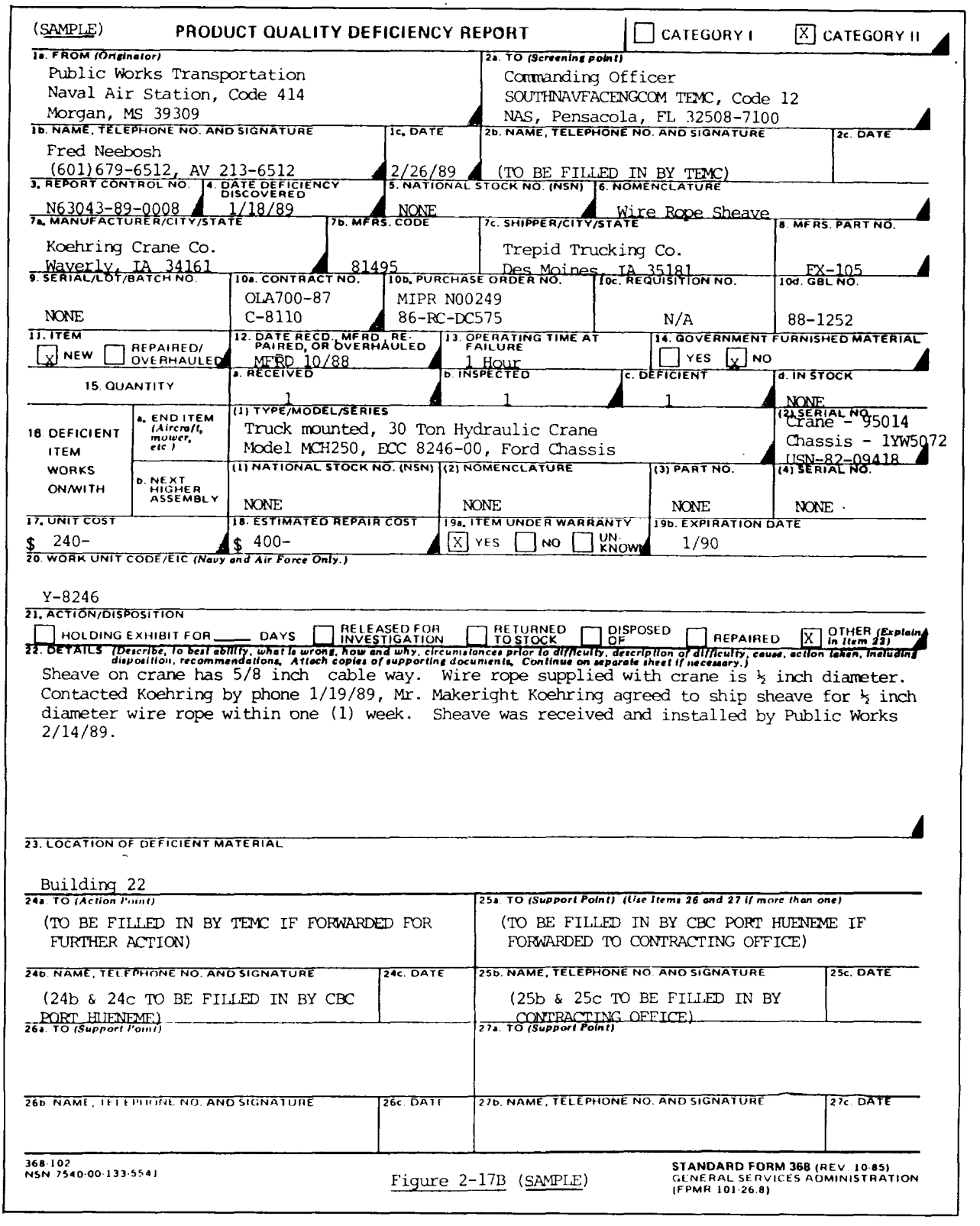
EQUIPMENT WARRANTIES AND DEFICIENCIES

Normally, warranties guarantee the equipment and its parts against defective material and workmanship for a period of time or miles specified in the procurement contract. Activities noting deficiencies within the warranty period should prepare and complete a Quality Deficiency Report, SF 368 (fig. 1-7), and distribute them to the appropriate addressees as soon as possible.

1. Original to the appropriate Engineering Field Division (EFD), Transportation Equipment Management Center (TEMC)
2. Copy to CBC Port Hueneme Calif. (CODE 153)
3. Copy to NAVFACENGCOM (CODE 1202)

NOTE

Procedures for submittal for Special Operating Units (SOUs) and Naval Mobile Construction Battalions (NMCBs) can be found in chapter 2, section 5, of *Naval Construction Force Equipment Management Manual,* NAVFAC P-404, or in section 7, paragraph 1705, of COMCB-PAC/COMCBLANTINST 11200 series.



(SAMPLE) **PRODUCT QUALITY DEFICIENCY REPORT** ☐ CATEGORY I ☒ CATEGORY II

1a. FROM (Originator)
Public Works Transportation
Naval Air Station, Code 414
Morgan, MS 39309

2a. TO (Screening point)
Commanding Officer
SOUTHNAVFACENGCOM TEMC, Code 12
NAS, Pensacola, FL 32508-7100

1b. NAME, TELEPHONE NO. AND SIGNATURE: Fred Neebosh (601)679-6512, AV 213-6512
1c. DATE: 2/26/89
2b. NAME, TELEPHONE NO. AND SIGNATURE: (TO BE FILLED IN BY TEMC)
2c. DATE:

3. REPORT CONTROL NO.: N63043-89-0008
4. DATE DEFICIENCY DISCOVERED: 1/18/89
5. NATIONAL STOCK NO. (NSN): NONE
6. NOMENCLATURE: Wire Rope Sheave

7a. MANUFACTURER/CITY/STATE: Koehring Crane Co. Waverly, IA 34161
7b. MFRS. CODE: 81495
7c. SHIPPER/CITY/STATE: Trepid Trucking Co. Des Moines, IA 35181
8. MFRS. PART NO.: FX-105

9. SERIAL/LOT/BATCH NO.: NONE
10a. CONTRACT NO.: OLA700-87 C-8110
10b. PURCHASE ORDER NO.: MIPR N00249 86-RC-DC575
10c. REQUISITION NO.: N/A
10d. GBL NO.: 88-1252

11. ITEM: ☒ NEW ☐ REPAIRED/OVERHAULED
12. DATE RECD., MFRD., REPAIRED, OR OVERHAULED: MFRD 10/88
13. OPERATING TIME AT FAILURE: 1 Hour
14. GOVERNMENT FURNISHED MATERIAL: ☐ YES ☒ NO

15. QUANTITY: a. RECEIVED: 1; b. INSPECTED: 1; c. DEFICIENT: 1; d. IN STOCK: NONE

16. DEFICIENT ITEM WORKS ON/WITH
a. END ITEM (Aircraft, mower, etc.): (1) TYPE/MODEL/SERIES: Truck mounted, 30 Ton Hydraulic Crane Model MCH250, ECC 8246-00, Ford Chassis; (2) SERIAL NO.: Crane - 95014 Chassis - 1YW5072 USN-82-09418
b. NEXT HIGHER ASSEMBLY: (1) NATIONAL STOCK NO. (NSN): NONE; (2) NOMENCLATURE: NONE; (3) PART NO.: NONE; (4) SERIAL NO.: NONE

17. UNIT COST: $ 240-
18. ESTIMATED REPAIR COST: $ 400-
19a. ITEM UNDER WARRANTY: ☒ YES ☐ NO ☐ UNKNOWN
19b. EXPIRATION DATE: 1/90

20. WORK UNIT CODE/EIC (Navy and Air Force Only.): Y-8246

21. ACTION/DISPOSITION: ☐ HOLDING EXHIBIT FOR ____ DAYS ☐ RELEASED FOR INVESTIGATION ☐ RETURNED TO STOCK ☐ DISPOSED OF ☐ REPAIRED ☒ OTHER (Explain in Item 22)

22. DETAILS (Describe, to best ability, what is wrong, how and why, circumstances prior to difficulty, description of difficulty, cause, action taken, including disposition, recommendations. Attach copies of supporting documents. Continue on separate sheet if necessary.)
Sheave on crane has 5/8 inch cable way. Wire rope supplied with crane is ½ inch diameter. Contacted Koehring by phone 1/19/89, Mr. Makeright Koehring agreed to ship sheave for ½ inch diameter wire rope within one (1) week. Sheave was received and installed by Public Works 2/14/89.

23. LOCATION OF DEFICIENT MATERIAL: Building 22

24a. TO (Action Point): (TO BE FILLED IN BY TEMC IF FORWARDED FOR FURTHER ACTION)
25a. TO (Support Point) (Use Items 26 and 27 if more than one): (TO BE FILLED IN BY CBC PORT HUENEME IF FORWARDED TO CONTRACTING OFFICE)

24b. NAME, TELEPHONE NO. AND SIGNATURE: (24b & 24c TO BE FILLED IN BY CBC PORT HUENEME)
24c. DATE:
25b. NAME, TELEPHONE NO. AND SIGNATURE: (25b & 25c TO BE FILLED IN BY CONTRACTING OFFICE)
25c. DATE:

26a. TO (Support Point)
27a. TO (Support Point)

26b. NAME, TELEPHONE NO. AND SIGNATURE
26c. DATE
27b. NAME, TELEPHONE NO. AND SIGNATURE
27c. DATE

368-102
NSN 7540-00-133-5541

STANDARD FORM 368 (REV. 10-85)
GENERAL SERVICES ADMINISTRATION
(FPMR 101-26.8)

Figure 2-17B (SAMPLE)

Figure 1-7.–Quality Deficiency Report, SF 368.

PAGE 1 OF 1

STANDARD FORM 120 REV. APRIL 1957 GEN. SERV. ADMIN. FPMR (41 CFR) 101-43.311

REPORT OF EXCESS PERSONAL PROPERTY

1. REPORT NO.	2. DATE MAILED	3. TOTAL COST
N00187-0151-L	31 May 19	$ 3,954.00

4. TYPE OF REPORT (Check one only of "a," "b," "c," or "d") — X a. ORIGINAL; b. CORRECTED; c. PARTIAL W/D; d. TOTAL W/D; (Also check "e" and/or "f" if appropriate) e. OVERSEAS; f. CONTRACTORS INV

5. TO (Name and Address of Agency to which report is made) THRU

Defence Property Disposal Officer

6. APPROP. OR FUND TO BE REIMBURSED (if any)

7. FROM (Name and Address of Reporting Agency)

Commanding Officer
Public Works Center, Norfolk, VA 23511

8. REPORT APPROVED BY (Name and Title)

J. Smith
Director, Trans. Dept.

9. FOR FURTHER INFORMATION CONTACT (Title, Address and Telephone No.)

J. Jones
Equipment Operation (804) 444-0000, AV 564-0000

10. AGENCY APPROVAL (if applicable)

11. SEND PURCHASE ORDERS OR DISPOSAL INSTRUCTIONS TO (Title, Address and Telephone No.)

See Block 7

12. GSA CONTROL NO.

13. FSC GROUP NO.	14. LOCATION OF PROPERTY (If location is to be abandoned give date)	15. REIM/REQD YES	15. REIM/REQD NO	16. AGENCY CONTROL NO.	17. SURPLUS RELEASE DATE
	N00187 Navy Public Works Center, Norfolk, VA		2		

18. EXCESS PROPERTY LIST

ITEM NO. (a)	DESCRIPTION (b)	COND. (c)	UNIT (d)	NUMBER OF UNITS (e)	ACQUISITION COST PER UNIT (f)	ACQUISITION COST TOTAL (g)	FAIR VALUE % (h)
001	FSN 2C2310-828-7158 USN 92-00000 EC 0104 Type/Capacity: Sedan, Compact Make/Model: Ford Maverick Year Mfg.: 1975 Engine Chassis No.: 18BFD4765DDC45 Cum Mileage: 79,341 Est. Cost to Place in B5 Condition: (1) Overhaul engine $450 (2) Renew rear axle 147 (3) Replace windshield 125 (4) Repair rusted out floorboard 196 (5) Rebuild trans. 275 TOTAL $1193 (When submitted directly to DPDO add) Copy to: (appropriate TEMC)	B-8	ea	1	3,954.00	3,954.00	

STANDARD FORM 120 REV. APRIL 1957 EDITION (Use Standard Form 120A for Continuation Sheets) 120-104

Figure 1-8.—Report of Excess Personal Property, SF 120.

Be sure to describe the deficiency in detail. Use photographs and sketches. (Include a ruler in the photograph.) If the deficiency has been corrected before submittal, mark the SF 368, CORRECTIVE ACTION COMPLETED. If the deficiency has not been corrected, mark the SF 368 FOR ACTION.

SAFETY DEFICIENCIES

All civil engineer support equipment (CESE), regardless of warranty coverage, developing design deficiencies affecting safe operation are to be immediately removed from service and reported by message to CBC PORT HUENEME (CODE 153), and followed up with a SF 368. These units are not to be repaired or returned to service until directed by CBC PORT HUENEME (CODE 153).

IN CONTINENTAL UNITED STATES

Activities within the continental United States are to use an available franchised dealer for repairs. If these sources prove unsatisfactory, contact the cognizant engineering field division (EFD) (TEMC) to obtain resolution.

OUTSIDE CONTINENTAL UNITED STATES

Activities outside the continental United States are to request the replacement parts directly from the prime contractor. An SF 368 is to be submitted. The activity is not to forward the defective part.

Further information may be found in the NAVFAC P-300, chapter 23.

TECHNICAL ASSISTANCE

TEMC representatives visit periodically to analyze and assist the activity. These visits are specifically designed to review technical and management procedures to increase the efficiency and effectiveness of the activity. The TEMC representative validates the equipment allowance and reviews operations and maintenance procedures. A report of the visit and its findings, including items of major interest, is made to the commanding officer before the departure of the TEMC representative.

Transportation assistance visits are made at 18-month intervals for activities with 50 or more pieces of CESE. Visits are scheduled each 3 years for activities with less than 50 pieces of CESE. Additional visits are optional and should be requested if desired.

CESE DISPOSAL

As CESE becomes uneconomical to repair, or simply overage, it has to be disposed of properly. Whatever the instance, a Report of Excess Personnel Property, SF 120 (fig. 1-8), is to be submitted to the cognizant TEMC.

SERVICEABLE EQUIPMENT

When CESE is in excess but still serviceable, the TEMC will check and ascertain that no other Navy requirements exist for this CESE. If no other requirements exist, the cogizant TEMC or Port Hueneme (Code 15) will instruct your activity to place the CESE in the nearest Defense Recycling Management Office (DRMO).

UNSERVICEABLE EQUIPMENT

For all unserviceable CESE, contact the cognizant TEMC for disposal instructions and approval. After TEMC approval, turn in the CESE and its history jacket to the nearest DRMO, using a DD Form 1348-1 as a transfer document. Ambulances and dental vehicles have special disposal instructions listed in *Management of Transportation Equipment,* NAVFAC P-300.

INVENTORY RECORDS ADJUSTMENT

Once disposal action is completed, it is important to adjust the records to reflect changes in your activity's CESE inventory allowance. Therefore, it is essential that your TEMC and Port Hueneme (Code 15) receive copies of the Report of Excess Personal Property, SF 120; the transfer document Single Line Item Release/Receipt Document, DD-1348-1, from the disposal office; and the Property Record Card, DD-1342.

REFERENCES

Construction Equipment Department Management and Operations Manual, NAVFAC P-434, Naval Facilities Engineering Command, Washington, D.C., 1982.

Construction Mechanic 1, NAVEDTRA 10645-F1, Naval Education and Training Program Management Support Activity, Pensacola, Fla., 1989.

Management of Transportation Equipment, NAVFAC P-300, Naval Facilities Engineering Command, Washington, D.C., 1985.